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was comparatively small, the secondary recoveries are the only important domestic source of supply. The production of tin from ore mined in the United States is negligible, so that the secondary recoveries constitute practically the sole domestic supply. The use of old tin cans as a source of tin was not extended. The cost of collecting, transportation charges and inability to dispose of the old black plate from which the tin is wholly or partly removed are the principal reasons given why more old tin cans are not utilized.

UNIVERSITY AND EDUCATIONAL NEWS

THE daily papers state that there will be established at Ragland, Ala., an industrial school for white children by the Southern Board of Education with funds amounting to \$5,000,000 to be given by Mr. John D. Rockefeller, the Russell Sage Foundation, Mrs. E. H. Harriman and others. Ragland offered 5,000 acres for the site, 200 lots in town, water power and other considerations.

DR. S. N. KOLACEOSKIJ, who died recently, bequeathed all his property, estimated at 40,000,000 rubles, for the establishment, in southern Russia, of an agricultural academy.

CONCRETE foundations have been completed for Rand Hall, the new Sibley shop building, of Cornell University, and steel for the framework is arriving on the premises.

As previously announced, the inauguration of Dr. Guy Potter Benton as president of the University of Vermont will take place on the fifth and sixth of October. Following the general plan already given, the formal inauguration exercises will take place on the second day. The first day will be given to a conference between colleges and secondary schools on the subject, "College Requirements and the Secondary Curriculum."

CARBON GILLASPIE, M.D. (Colorado), has been appointed professor of anatomy in the University of Colorado. Since 1909 Dr. Gillaspie has been instructor in this department. He will give all his time to teaching.

MR. WILLIAM J. MCCAUGHEY, mineralogist and petrographer of the U. S. Bureau of Soils,

has been appointed as assistant professor in metallurgy and mineralogy in the Ohio State University.

P. F. GAHR, Ph.D. (Cornell), formerly of Robert College, Constantinople, has been appointed professor of physics at Wells College, Aurora, N. Y.

ADDITIONS to the faculty of the Agricultural College of Utah for the year 1911-12 are as follows: E. G. Titus, Sc.D. (Harvard), professor of entomology; F. L. West, Ph.D. (Chicago), professor of physics; Elmer G. Peterson, A.M., Ph.D. (Cornell), professor of bacteriology; F. S. Harris, Ph.D. (Cornell), professor of agronomy; C. N. Jensen, M.S.A. (Cornell), professor of botany and plant pathology; J. E. Greaves, Ph.D. (California), associate professor of chemistry; and W. E. Carroll, M.S. (Illinois), assistant professor of animal husbandry. J. C. Hogenson has been transferred from college work to the extension division as agronomist. The extension division has been enlarged further by employing Miss Hazel Love Dunford for work in home economics.

DR. A. N. WHITEHEAD, F.R.S., fellow of Trinity College, Cambridge, has been appointed to succeed Mr. E. Cunningham, as lecturer in the department of applied mathematics and mechanics in the University College, London.

DISCUSSION AND CORRESPONDENCE

MOISTURE AND OUT-OF-DOORS

TO THE EDITOR OF SCIENCE: This being the deadest time of the year, when nobody reads SCIENCE, and the post-office refuses to send it after one, I am emboldened to take my pen in hand. The two very clear letters by Messrs. Mott-Smith and Wilson, in answer to Dr. L. H. Gulick's query regarding moisture in the air, together with those of Messrs. Kent, Crowell and Jones in the issue of March 31, leave little or nothing to be said on the subject. What I wish to emphasize is the feeling of shock that I experienced when a medical man of the standing of Dr. Gulick could ask such questions in good faith, when, as has been said, the answers to them can be

found in any treatise on physics. Taking the one which happens to be nearest my hand, that of Magie, I find the subject treated completely in four pages. The point I wish to make is that these matters are taught in freshman courses. But who takes these courses? There is the rub. Of course we know that all engineering students are compelled to take courses in physics. We also know that most chemists take them. Some now even take courses in mathematics, and when a chemist gets a control of mathematics, we know how he makes mathematics hum! One would expect that every medical student would be required to take a course in physics. In other countries this is so. I remember how the elementary courses of Helmholtz and Kundt were so choked up with "Mediziner" as to cause them to grumble. But I fancy that in this country things are here as elsewhere, somewhat at loose ends. A few years ago I remember hearing an address by Dr. Welch on the relations of medicine to physics, so clear, so luminous, so interesting, so learned that it seemed to me that no other medical man in the country could have given it, and I thought, fortunate is the medical school that has such a teacher! But why should not everybody desiring to be liberally educated study physics? I do not stop to give the reasons, everybody that is liberally educated knows them. And yet we see chemists, psychologists, physiologists, microscopists and many others, every one of whose tools is physical, ignorant of this fundamental science and its methods, and the intelligent man in the street is asking whether the drought is due to the great increase of electric railroads! And how many of our colleges require everybody to take a course in physics? I can not answer this definitely, but I know of only one, Princeton, and I will say to the honor of that institution that I was told that this was the only subject on which the faculty was unanimous.

But Dr. Gulick's letter is on a very important subject, on which an enormous amount depends, and on which little seems to be known. The question is, briefly, what is the advantage of out-doors over in-doors? All I

can contribute to this is a little scientific common-sense. If it is due to the air, as seems implied by most writers, what properties has the air? These can be of only three kinds: first, physical; second, chemical; third, biological. The physical properties are very simple and easily investigated. They are its temperature, pressure and density, and the density of water vapor in it. To these I venture to add its ionization. No discussion is now complete without some mention of ions, so put that in. Do not forget the sunlight. The chemical aspect is simple and consists only in the knowledge of the amounts of the various gases present. Finally, there is the question of what and how many microorganisms are present. This, the most difficult and perhaps the most important of all, we may turn over to the biologist. Dr. Gulick, who says that he has digested all the literature found in the bibliographies, says that "we know definitely" that there is no such thing as a subtle human poison (anthropotoxin) which varies in proportion to the CO_2 . Very well, but, to use the vernacular, "they tell me different."

As an illustration of what I have said, consider what happens when a man smoking a cigar comes into my neighborhood. The first impression that I get is a sense of filth (stink is what the Bible says). This is psychological, and I will not go into it. Then I realize that the chemical equilibrium of the atmosphere has been destroyed, and that a foreign physical body has been introduced, though whether the pressure of the air has been altered I can not say. Also whether there is an anthropotoxin present I can only query, although I know one *anthropos* that is immediately toxized.

Now for the question, what *is* out-doors? Obviously the question of doors and walls is not the main thing. We know that, *ceteris paribus*, the same effects will follow. The only question is as to what "*ceteris*" are "*paribus*." Does any one doubt that, if the air is physically, chemically and biologically (microorganisms) the same indoors and out, the physiological effects will be the same?

Why, the thing has never been tried! In the name of suffering humanity, let us try it, in the manner suggested by Professor Kent. I have not the slightest doubt that the superiority of out-doors for the health is due to the fact that it is impossible in-doors to secure the circulation of the air that will continually remove the noxious products and replace the air with absolutely good air. Again look at the smoker. It is with difficulty that you can get him to smoke in the open air. It takes away his filthy chemical, and he will often admit to you that at night, and out-of-doors, he can not tell whether he is smoking or not. Thus he gives his whole case away, and helps me in my argument.

There is one other thing that we must not overlook, and that is the sun. I dare say that in spite of all we might do to the air, if we did not pass it out into the sun we should not accomplish much. What does the sun do to the air? Photochemistry will have to answer this, and it soon will. And finally remember that the conditions of radiation of heat from our bodies are totally different when we are surrounded by walls and when not. The question of out-doors is, accordingly, not a simple one, but is composed of simple parts. Let us attack it in detail. Perhaps it will be answered before the other equally important one, *Shall we wash?* And this reminds me of a passage in Dr. Gulick's letter which I can not let pass. In a well ventilated school-room (in London) there was "no smell of human beings—this was only noticeable when one stood among the *boys*" (italics mine). As an ex-boy I resent this.¹

Finally let me suggest an answer to Mr. Mott-Smith's last question: "Why is a little sneaking draught in the house a source of colds and grippe, while a high wind out-of-doors a pleasure and a benefit?" I suspect that the answer will be Mr. Dooley's consoling one to Hennessey, "It ain't so!"

ARTHUR GORDON WEBSTER

WORCESTER, MASS.,

August 4, 1911

¹It has occurred to me that perhaps it was a boys' school.

ELECTRONS

TO THE EDITOR OF SCIENCE: Will you permit an old foggy to trespass on your space long enough to ask a simple question? I confess that in spite of bibliographies, card catalogues, scientific management and all the helps to the weary, I have lately found it impossible to keep up, and find myself confronted with the horrid thought of having to become a specialist. I have not even been able to read all that the chemists have written about physics. Now whether we agree with what has recently been said by a notorious chemist (perhaps I mean noted, but the weather is so hot) that "we appreciate fully that physics, geology, engineering, physiology, medicine, botany, zoology and biology (why not astronomy?) are subdivisions of the broader science of chemistry, we see that the chemist of the future must know a great deal more than any of us do now"—whether we agree with this poet or not (and I cordially agree with his final statement) we know that in future the physicist has got to sit at the feet of the chemist (I hope he will sit *on* them). But in Professor McCoy's very interesting article on metals I find the following statement, which causes me some difficulty: "The charge of the electron is negative in sign. In fact we have decisive experimental evidence of only this one kind of free electricity, positive electrification of a body being from this standpoint merely a deficiency of electrons. J. J. Thomson has shown how from the conception of an atom made up of electrons rotating in a sphere of positive electrification, there follows," etc. Now I submit that logically the above statement would be helped by a substitution in the last sentence of the definition from the next to the last, so as to read: "an atom made up of electrons rotating in a sphere of merely a deficiency of electrons," etc. What I want to know is, what is this spherical deficiency made of? Is it a hole in a space all full of electrons? If so, what about the lonely electrons rotating in this hole in the whole body of electrons? But perhaps